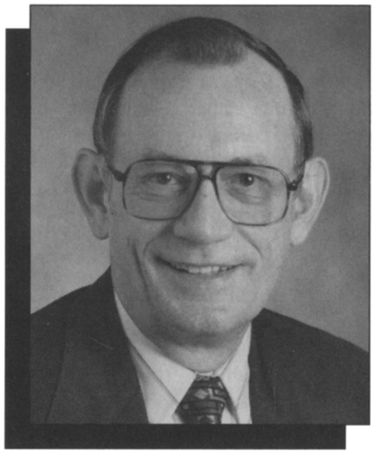
Peercy to Give Plenary Speech on the Future of Semiconductor Materials Research

Paul S. Peercy, president of SEMI/SEMATECH, a consortium of about 200 U.S.-owned and controlled semiconductor equipment and supplier companies, will present the plenary talk at the 1997 MRS Spring Meeting in San Francisco on Monday, March 31, 6:00 p.m., in Salon 7 at the San Francisco Marriott. In his discussion, "Semiconductor Materials Research for the Twenty-First Century," Peercy will elaborate on "projections for the future of the [semiconductor] industry, along with selected future materials and processing research needs."



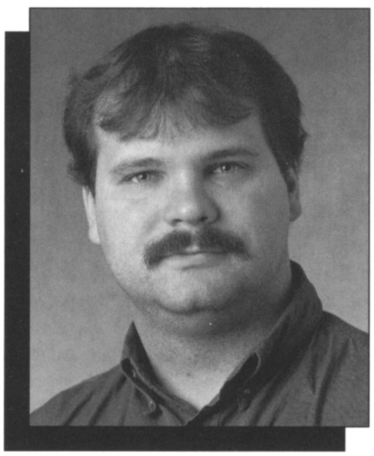
Paul S. Peercy

Recent structural modifications in the semiconductor industry, driven by international competition and the increasing complexity of products and processes, is changing the way research and development is handled. Previously, large, vertically integrated companies not only manufactured integrated circuits but also conducted the research of materials, processes, and equipment for integrated circuits. Device manufacturers in the future will outsource materials and processing technology to supplier companies who will incorporate the technology into semiconductor manufacturing equipment.

Peercy received his PhD degree from the University of Wisconsin—Madison in 1966. He was meeting chair for the 1984 MRS Fall Meeting, served two terms as program chair for MRS, and served as councillor and as second vice-president of the Society. MRS

Bowman Receives OYI Award for Work on Polymers

Christopher N. Bowman is the 1997 recipient of the Materials Research Society's Outstanding Young Investigator Award. The University of Colorado chemical engineering professor is cited "for seminal contributions to the field of highly crosslinked polymers, information storage materials, and computational methods in polymerization engineering."



Christopher N. Bowman

The Outstanding Young Investigator Award recognizes exceptional, interdisciplinary scientific work in materials research by a young scientist or engineer who also displays leadership in the materials area.

Bowman's work focuses on kinetics and reaction engineering of multifunctional monomer polymerizations, preparation of novel membranes with specific active sites for separations, and preparation of microparticles with reactive sites for separations and purifications.

In his early studies, Bowman developed imaginative mathematical models to describe the polymerization reactions of multifunctional acrylates and methacrylates. He introduced the relaxation of the developing macromolecular structure to the kinetic model, and showed that certain phenomena such as volume shrinkage during polymerization can be explained by this relaxation process. Important applications of this work include the production of optical fibers, laser video disks, compact disks, and aspherical lenses. By developing well-characterized, crosslinked polymers, controlling the transport and release of solutes such as drugs, peptides, and proteins through such polymers should be possible.

Bowman has made major advances in understanding the kinetics of polymerization reactions. In a series of papers, Bowman demonstrated that a relaxational process, if coupled with the reactions, leads to chain diffusion dependent on free volume changes. He showed that the relaxation time can be calculated by real kinetic data, and he developed a calorimetric technique to follow the kinetics of fast ultraviolet-curing reactions. He also developed a laser interferometric technique to study the relaxational process. In a typical application, a liquid multifunctional monomer is exposed to light at room temperature and polymerized in seconds to form a densely-crosslinked polymer network.

An advanced kinetic gelation simulation developed by Bowman predicts the evolution of complex microstructures, particularly how the reaction conditions influence this evolution. In recent work, Bowman demonstrated that it is possible to simulate the gelation process in multimethacrylate reactions in the presence of micro- and macrocyclization processes by considering diffusion-controlled phenomena. From this simulation, he developed a rational approach to design dental resins with improved properties. The maximum conversion of double bonds in existing dental resins can be increased by adding small amounts of a higher molecular weight monomer.

The increased conversion was achieved without compromising the mechanical strength and dimensional stability of the polymer restoration, and the shrinkage associated with polymerization decreased. Such studies provide pathways to resolve specific issues such as incomplete conversion of double bonds, mechanical strength, and ease of cure that are of such importance to the applicability of photocrosslinked polymers. His biomedical research addresses important aspects of the design, characterization, and evaluation of new dental materials.

Bowman received a BS and PhD degree in 1988 and 1991, respectively, in chemical engineering from Purdue University. He joined the faculty at the University of Colorado in 1992, and was promoted to associate professor three years later.

The OYI Award will be presented to Bowman on Monday, March 31, at 6:00 p.m. at the 1997 MRS Spring Meeting in San Francisco. He will also give a presentation, "Polymerizations and Properties of Polymer Stablized Ferroelectric Liquid Crystals," at 5:00 p.m. on Wednesday, April 2, in Symposium G at the Meeting. His lecture will focus on understanding how polymers change electro-optic and phase behavior, and how liquid crystals influence the polymerization. MRS